What is Claimed:

1. A multiple component refrigerant comprising at least two components, with each component selected from one of the groups consisting of: (a) inert atmospheric gases; (b) normally gaseous and liquid fluorocarbons; (c) normally gaseous and liquid hydrofluorocarbons; and (d) normally gaseous and liquid hydrocarbons.

2. The refrigerant of claim 1 wherein the fluorocarbons contain from 1 to about 5 carbon atoms, the hydrofluorocarbons contain from 1 to about 4 carbon atoms, and the hydrocarbons contain from 1 to about 5 carbon atoms.

3. The refrigerant of claim 1 wherein the inert atmospheric gases are present in an amount of up to about 60 mol %, the fluorocarbons are present in an amount of up to about 55 mol %, the hydrofluorocarbons are present in an amount of up to about 55 mol %, and the hydrocarbons are present in an amount of up to about 50 mol %.

4. The refrigerant of claim 1 wherein the hydrocarbons are present in an amount and in proportion to the other components such that refrigerant is non-flammable.

5. The refrigerant of claim 1 wherein the refrigerant comprises at least two components with each component selected from a different one of the groups consisting of: inert atmospheric gases; normally gaseous and liquid fluorocarbons; and normally gaseous and liquid hydrofluorocarbons.

6. A multiple component refrigerant composition for use in a closed cycle refrigeration system for producing cooling temperatures below 230°K and above 70°K consisting of:

15 to 60% by volume of an inert gas selected from the group consisting of helium, argon, neon, nitrogen or mixtures thereof;

25 to 50% by volume of a fluorocarbon; and

0 to 50% by volume of a hydroflurocarbon.

7. A composition according to claim 6 wherein said fluorocarbon is selected from the group consisting of CF_4 and C_2F_6, C_3F_8 and mixtures thereof.

8. A composition according to claim 6 wherein said hydrofluorocarbon is selected from the group consisting of CHF_3, C_2HF_5, $C_2H_2F_4$, $C_3H_2F_6$, $C_3H_3F_5$, C_3HF_7, $C_2H_4F_2$, $C_2H_3F_3$, CH_2F_2 and mixtures thereof.

9. A composition according to claim 6 including from 10% by volume to 85% by volume hydrocarbon instead of said fluorocarbon or said hydrofluorocarbon.

10. A composition according to claim 9 wherein the hydrocarbon is selected from the group consisting of methane, ethane, propane, isobutene, ethylene, normal butane, pentane, isopentane and mixtures thereof.

11. A method for improving a closed cycle refrigeration system used to produce temperatures in the range of from about 70 to about 230°K the refrigeration system having an oil lubricated compressor to produce high pressure high temperature refrigerant, an oil separator to remove oil from the refrigerant an after cooler to reduce the temperature of the high temperature high pressure refrigerant, a filter/dryer to remove water from the refrigerant, a heat exchanger wherein the high temperature high pressure refrigerant is cooled by heat exchange with a low pressure low temperature refrigerant, a throttle device to expand the high pressure refrigerant and produce a low pressure cold refrigerant at a point of use, and means for returning the low pressure refrigerant to the oil lubricated compressor, a gaseous refrigerant in said system, said refrigerant having no components normally condensed in said after-cooler; comprising: placing said after cooler immediately downstream of a high pressure outlet of said compressor and before said oil separator, and using an oil separator having less than 7 psig pressure drop between an inlet and an outlet and an oil carryover rate less than 0.001 grams/hour.

12. The method of claim 11 wherein the oil separator operates to produce a refrigerant containing less than about 1% by weight lubricating oil.

13. A closed cycle refrigeration system to produce temperatures in the range of from about 70 to about 230°K comprising in combination: a refrigerant consisting of at least two components, with each component selected from any one of the groups consisting of atmospheric gases, normally gaseous and liquid fluorocarbons, normally gaseous and liquid hydrofluorocarbons, and normally gaseous and liquid hydrocarbons; an oil lubricated compressor to pressurize said

refrigerant, an after cooler to receive and cool said pressure refrigerant, an oil separator to receive said refrigerant and remove oil from said refrigerant so as to produce a refrigerant containing less than 1% by weight lubricating oil in the refrigerant, a filter/dryer to receive said refrigerant from said oil separator and remove water from said refrigerant; a heat exchanger to receive said refrigerant from said filter/dryer and cool said refrigerant by heat exchange with a low pressure refrigerant return stream; a fixed orifice throttle device to receive said refrigerant stream from said heat exchanger and expand said high pressure refrigerant to produce a low pressure low temperature refrigerant stream, said throttle device so constructed and arranged to provide during cooldown of said refrigerant from normal ambient temperature more than about 60% of the maximum refrigeration capacity of said system available during desired steady state operation of said system, resulting in a low pressure low temperature refrigerant stream, means for utilizing said low pressure low temperature refrigerant stream to provide cooling and means for returning a warmed low pressure refrigerant stream to the oil lubricated compressor.

14. The closed cycle refrigeration system of claim 13 wherein the refrigerant contains a hydrocarbon present in an amount to maintain the refrigerant as non-flammable.

15. The closed cycle refrigeration system of claim 13 wherein said refrigerant is a mixture of an inert atmospheric gas, fluorocarbons containing from 1 to about 5 carbon atoms, and a hydrofluorocarbons containing from 1 to about 4 carbon.

16. A closed cycle refrigeration system according to claim 13 wherein the refrigerant is a mixture of two components selected from one of the group consisting of and normally liquid and gaseous hydrofluorocarbons.

17. A closed cycle refrigeration system according to claim 13 wherein the components of the refrigerant are selected such that the difference in normal boiling points between any component and the next higher boiling point component is no more than about 100°K.

18. A closed cycle refrigeration system according to claim 17 wherein the components of the refrigerant are selected such that the difference in normal boiling points between any two components is at least about 1°K.

19. A closed cycle refrigeration system according to claim 17 wherein the components of the refrigerant are selected such that the normal boiling points of the highest and lowest boiling components will differ from each other by about at least 30°K.

20. A closed cycle refrigeration system for providing cooling temperatures from about 70°K to 230°K comprising in combination: an oil lubricated compressor for creating a high pressure refrigerant stream; an after cooler connected to an outlet of said compressor to further cool said high pressure refrigerant stream; an oil separator connected to an outlet of said after cooler, said oil separator adapted remove residual oil from said high pressure refrigerant stream so that said high pressure refrigerant stream exiting said oil separator contains less than 1% by weight retained oil; means connected to said oil separator to extract water from said

high pressure refrigerant stream; a heat exchanger connected to said means to extract water for further cooling said high pressure refrigerant stream against a returning low pressure refrigerant stream; expansion means connected to said heat exchanger to reduce the pressure of said refrigerant stream to produce a low pressure low temperature refrigerant stream; means to utilize the low pressure low temperature refrigerant stream to provide cooling; and means to return said low pressure refrigerant to a low pressure inlet side of said compressor.

21. A closed cycle refrigeration system according to claim 20 wherein said expansion means is one of a capillary tube of fixed inside diameter and fixed length, a fixed orifice plate, or a fixed position needle valve.

22. A closed cycle refrigeration system according to claim 20 wherein said oil separator is so constructed and arranged to have less than 7 psig pressure drop between an inlet and an outlet and an oil carry over rate less than 0.001 grams per hour.

23. A closed cycle refrigeration system according to claim 20 wherein said oil separator has a maximum operating pressure of 400 psig.

24. A closed cycle refrigeration system according to claim 20 including an additional replaceable modular oil separator and modular means to extract moisture from said refrigerant stream placed upstream of said heat exchanger and downstream of said fixed oil separator.

25. A closed cycle refrigeration system according to claim 20 wherein said expansion means is a fixed orifice device so constructed and arranged

to enable said system to provide about 60% of the maximum steady state refrigeration capacity of the system during cool-down from ambient temperatures to a working temperature.